

AMENDMENTS TO THE CLAIMS

Claims 1-8 (Canceled)

9. (Previously Presented) A signal transmission apparatus comprising:

a modulator operable to assign a data stream of layer A and a data stream of layer B to a respective constellation in a signal space to produce a modulated signal of layer A and a modulated signal of layer B,

a converter operable to convert said modulated signal of layer A and said modulated signal of layer B into a converted signal in layer A and a converted signal in layer B respectively, according to orthogonal frequency division multiplexing, wherein each converted signal has an effective symbol signal and a guard interval signal, and

a transmitter operable to transmit said converted signals,

wherein the period of said effective symbol signal in layer A is larger than the period of said effective symbol signal in layer B.

10. (Previously Presented) A signal transmission apparatus according to claim 9, wherein a source divides into said data stream of layer A and said data stream of layer B.

11. (Previously Presented) A signal receiving apparatus comprising:

a received signal in layer A, and

a received signal in layer B,

a converter operable to convert said received signal in layer A and said received signal in layer B into a converted signal in layer A and a converted signal in layer B, respectively, according to orthogonal frequency division multiplexing, wherein each received signal has an effective symbol signal and a guard interval signal, and

a demodulator operable to demodulate said converted signal in layer A and said converted signal in layer B to produce a data stream of layer A and a data stream of layer B,

wherein the period of said effective symbol signal in layer A is larger than the period of said effective symbol signal in layer B.

12. (Previously Presented) A signal transmission system comprising a signal transmission apparatus and a signal receiving apparatus,

said signal transmission apparatus comprising;

a modulator operable to assign a data stream of layer A and a data stream of layer B to a respective constellation in a signal space to produce a modulated signal of layer A and a modulated signal of layer B,

a frequency-time converter operable to convert said modulated signal of layer A and said modulated signal of layer B into a frequency-time converted signal in layer A and a frequency-time converted signal in layer B respectively, according to orthogonal frequency division multiplexing, wherein each frequency-time converted signal has an effective symbol signal and a guard interval signal, and

a transmitter operable to transmit said frequency-time converted signal in layer A and said frequency-time converted signal in layer B, and

said signal receiving apparatus comprising;

a time-frequency converter operable to convert said frequency-time converted signal in layer A and said frequency-time converted signal in layer B into a time-frequency modulated signal in layer A and a time-frequency modulated signal in layer B, respectively, according to orthogonal frequency division multiplexing, and

a demodulator operable to demodulate said time-frequency modulated signal in layer A and said time-frequency modulated signal in layer B to produce said data stream of layer A and said data stream of layer B,

wherein the period of said effective symbol signal in layer A is larger than the period of said effective symbol signal in layer B.

13. (Previously Presented) A signal transmission system according to claim 12, wherein a source divides into said data stream of layer A and said data stream of layer B.

14. (Previously Presented) A signal transmission method comprising:
assigning a data stream of layer A and a data stream of layer B to a respective constellation in a signal space to produce a modulated signal of layer A and a modulated signal of layer B,
converting said modulated signal of layer A and said modulated signal of layer B into a converted signal in layer A and a converted signal in layer B respectively, according to orthogonal frequency division multiplexing, wherein each converted signal has an effective symbol signal and a guard interval signal, and
transmitting said converted signals,
wherein the period of said effective symbol signal in layer A is larger than the period of said effective symbol signal in layer B.

15. (Previously Presented) A signal transmission method according to claim 14, wherein a source divides into said data stream of layer A and said data stream of layer B.

16. (Previously Presented) A signal receiving method comprising:
a received signal in layer A, and
a received signal in layer B,
converting said received signal in layer A and said received signal in layer B into a converted signal in layer A and a converted signal in layer B, respectively, according to orthogonal frequency division multiplexing, wherein each converted signal has an effective symbol signal and a guard interval signal, and
demodulating said converted signal in layer A and said converted signal in layer B into a data stream of layer A and a data stream of layer B,
wherein the period of said effective symbol signal in layer A is larger than the period of said effective symbol signal in layer B.

17. (Previously Presented) A signal transmission and receiving method comprising a signal transmission method and a signal receiving method,

said signal transmission method comprising;

assigning a data stream of layer A and a data stream of layer B to a respective constellation in a signal space to produce a modulated signal of layer A and a modulated signal of layer B,

frequency-time converting said modulated signal of layer A and said modulated signal of layer B into a frequency-time converted signal in layer A and a frequency-time converted signal in layer B respectively, according to orthogonal frequency division multiplexing, wherein each frequency-time converted signal has an effective symbol signal and a guard interval signal, and

transmitting said frequency-time converted signal in layer A and said frequency-time converted signal in layer B, and

said signal receiving apparatus comprising;

time-frequency converting said frequency-time converted signal in layer A and said frequency-time converted signal in layer B into a time-frequency converted signal in layer A and a time-frequency converted signal in layer B, respectively, according to orthogonal frequency division multiplexing, and

demodulating said time-frequency converted signal in layer A and said time-frequency converted signal in layer B to produce said data stream of layer A and said data stream of layer B, and

wherein the period of said effective symbol signal in layer A is larger than the period of said effective symbol signal in layer B.

18. (Previously Presented) A signal transmission method according to claim 17, wherein a source divides into said data stream of layer A and said data stream of layer B.

19. (Previously Presented) A signal transmission apparatus according to claim 9, wherein the converter is an inverse Fast Fourier transformer.

20. (Previously Presented) A signal transmission apparatus according to claim 11, wherein the converter is a Fast Fourier transformer.

21. (Previously Presented) A signal transmission apparatus according to claim 12, wherein the frequency-time converter is an inverse Fast Fourier transformer, and the time-frequency converter is a Fast Fourier Transformer.

22. (New) A signal transmission apparatus comprising:

- a modulator operable to assign a data stream to a respective constellation in a vector space diagram to produce a modulated signal,

- a converter operable to convert the modulated signal into a converted signal having an effective symbol part and a guard interval, according to Orthogonal Frequency Division Multiplexing, and

- a transmitter operable to transmit the converted signal,

wherein the guard interval is selected from a plurality of predetermined time periods.

23. (New) A signal receiving apparatus comprising:

- a converter operable to convert a received signal, having an effective symbol part and a guard interval, into a converted signal according to Orthogonal Frequency Division Multiplexing, wherein the guard interval is selected from a plurality of predetermined time periods,

the received signal having information of a data stream which is assigned to a respective constellation in a vector space diagram, and

- a demodulator operable to demodulate the converted signal to produce the data stream.

24. (New) A signal transmission system comprising:

a signal transmission apparatus comprising:

- a modulator operable to assign a data stream to a respective constellation in a vector space diagram to produce a modulated signal,

- a frequency-time converter operable to convert the modulated signal into a frequency-time converted signal having an effective symbol part and a guard interval, according to Orthogonal Frequency Division Multiplexing, and

- a transmitter operable to transmit the frequency-time converted signal; and

- a signal receiving apparatus comprising:

- a time-frequency converter operable to convert the frequency-time converted signal into a time-frequency converted signal according to Orthogonal Frequency Division Multiplexing, and

- a demodulator operable to demodulate the time-frequency converted signal to produce the data stream;

- wherein the guard interval is selected from a plurality of predetermined time periods.

25. (New) A signal transmission method comprising:

- assigning a data stream to a respective constellation in a vector space diagram to produce a modulated signal,

- converting the modulated signal into a converted signal having an effective symbol part and guard interval, according to Orthogonal Frequency Division Multiplexing, and

- transmitting the converted signal,

- wherein the guard interval is selected from a plurality of predetermined time periods.

26. (New) A signal receiving method comprising:

- converting a received signal, having an effective symbol part and a guard interval, into a converted signal according to Orthogonal Frequency Division Multiplexing, wherein the guard interval is selected from a plurality of predetermined time periods,

- the received signal having information of a data stream which is assigned to a respective constellation in a vector space diagram, and

- demodulating the converted signal to produce the data stream.

27. (New) A signal transmission and receiving method comprising:
- a signal transmission method comprising:
 - assigning a data stream to a respective constellation in a vector space diagram to produce a modulated signal,
 - frequency-time converting the modulated signal into a frequency-time converted signal having an effective symbol part and a guard interval, according to Orthogonal Frequency Division Multiplexing, and
 - transmitting the frequency-time converted signal; and
 - a signal receiving method comprising:
 - time-frequency converting the frequency-time converted signal into a time-frequency converted signal according to Orthogonal Frequency Division Multiplexing, and
 - demodulating the time-frequency converted signal to produce the data stream;
- wherein the guard interval is selected from a plurality of predetermined time periods.